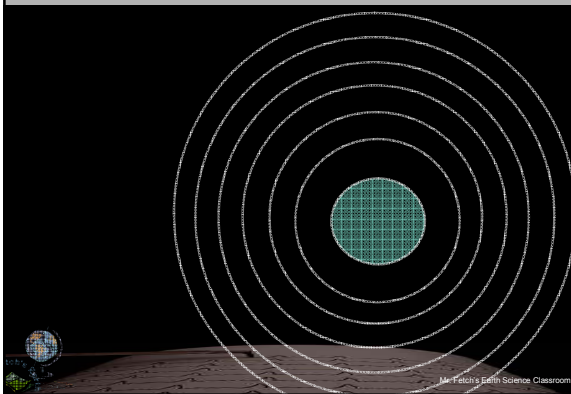


## Earthquakes



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## Earthquakes



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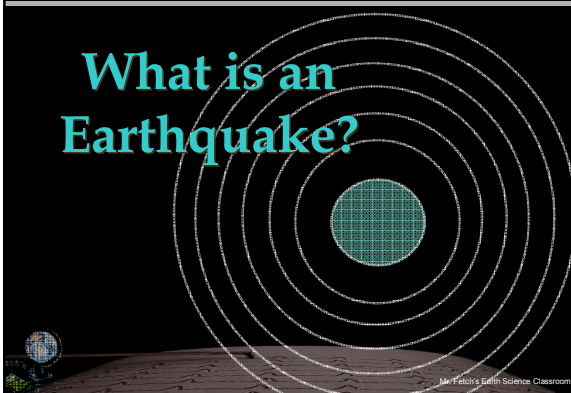
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## Earthquakes



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## Earthquakes

An earthquake is the **vibrations** produced when **rock snaps** and breaks under force.

Objects can only withstand so much force:

- A stick will snap when bent too far.
- A rubber band will break if pulled too tight.



An **elastic limit** is the maximum force an object can withstand **before breaking**.



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## Earthquakes

1. Rocks have an **elastic limit**.
2. Rocks will actually **bend** until they reach their elastic limit.
3. When rocks bend too far, they will then **break**.
4. The **break** or crack in the rock of earth's crust is called a **fault**.

**Faults form** when earth's plates move and place stress on one another, eventually forcing the **crust to snap**.



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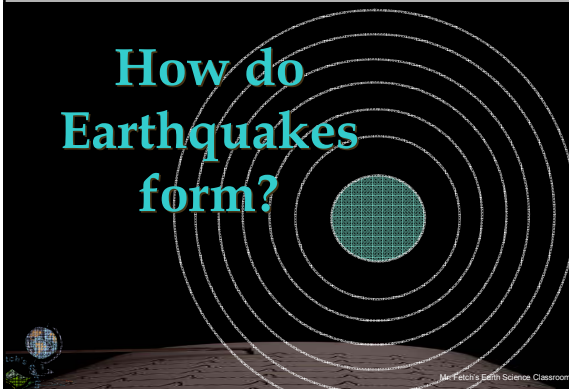
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## Earthquakes

How do  
Earthquakes  
form?



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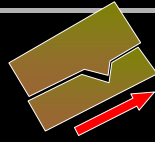
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## Earthquakes

Earthquakes occur when **rocks** move past each other **along a fault**.



- Rocks have **jagged** edges.
- The jagged edges along a fault get **stuck**.
- **Stress** builds up in the stuck rock as the plates try to move.
- The rocks bend until they reach their **elastic limit** and break.
- The rocks **snap** back to their **original** position (**elastic rebound**)
- The breaking of the rock creates an **earthquake**.



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## Movement along Faults: Types of Forces



Tension Force



Compression Force



Shearing Force



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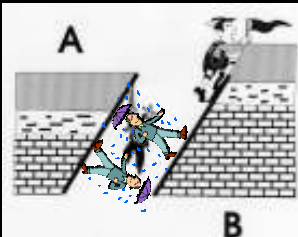
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## Earthquakes

### Faults



#### Foot wall:

The block of rock below the fault line. (Imagine being able to walk on it as if it were the floor below you).

#### Hanging wall:

The block of rock above the fault line. (Imagine being able to hang something from it as if it were a ceiling..)



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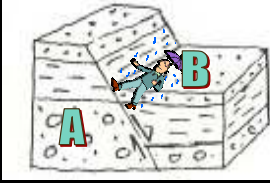
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## Earthquakes

### Faults



#### Foot wall:

The block of rock below the fault line. (Imagine being able to walk on it as if it were the floor below you).

#### Hanging wall:

The block of rock above the fault line. (Imagine being able to hang something from it as if it were a ceiling..)



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## Earthquakes

What are the major types of fault?



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## Earthquakes

There are 3 major types of faults:

Normal Faults

Reverse Faults

Strike/Slip faults.



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## Earthquakes

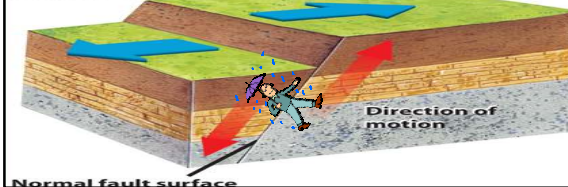
### Normal Faults



TYPES OF FORCES  
Tension Force

1. Caused by forces of **tension (stretching)**.
2. Tension forces pull rock **apart**.
3. Tension causes the **hanging wall to move down**.
4. This is called a **normal fault**.

Tension forces pull rocks apart.



## Earthquakes



## Earthquakes

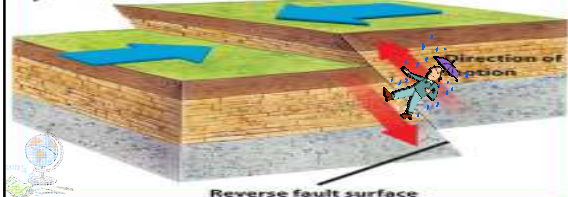
### Reverse Faults



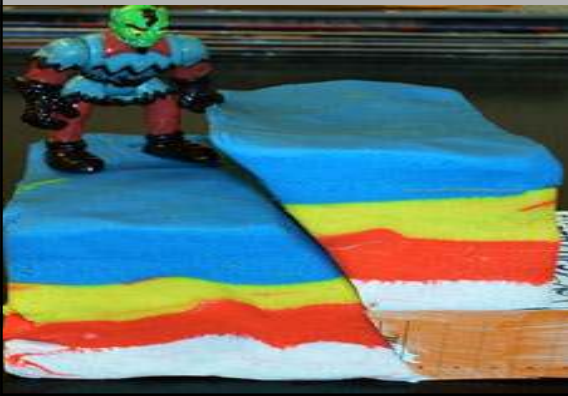
TYPES OF FORCES  
Compression Force

1. Caused by forces of **compression (pushing)**.
2. Compression forces **squeeze** rock together.
3. Compression causes the **hanging wall to move up**.
4. This is called a **reverse fault**.

Compression forces squeeze rock.



## Earthquakes



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## Earthquakes



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## Earthquakes

**Strike/Slip Faults**

**TYPES OF FORCES**  
**Shear Force**

1. Caused by forces of **shearing (sliding)**.
2. Shearing forces move rock in **opposite** directions.
3. The movement is only in a **horizontal direction**.
4. This is called a **strike/slip fault**.

Shear forces push rocks past each other.

Strike-slip fault surface

A 3D block diagram of a strike-slip fault. It shows two blocks of rock separated by a fault surface. Blue arrows on the top surface of the blocks point in opposite horizontal directions, indicating the movement of the rock. Red arrows on the side of the blocks point towards each other, representing the compressive forces that create the fault. The fault surface is shown as a vertical line separating the two blocks.

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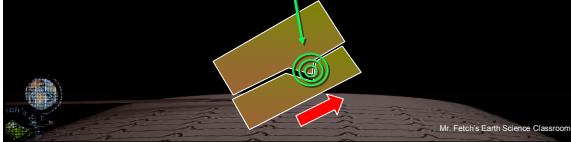
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## Earthquakes

When rocks break and an earthquake occurs a significant amount of stored energy is released.

- The energy travels through Earth in the form of waves.
- The waves are called **seismic waves**.
- The waves start in the crust **where the rocks break**.
- This location is called the **focus**.
- The seismic waves **travel outward** from this point.
- This outward traveling energy causes earthquake damage.



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## Next time...

**Seismic waves  
and why they  
are so  
dangerous...**



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